

HM2.2.2 / PI-1 Technical Description

1. OVERVIEW AND METHODOLOGY

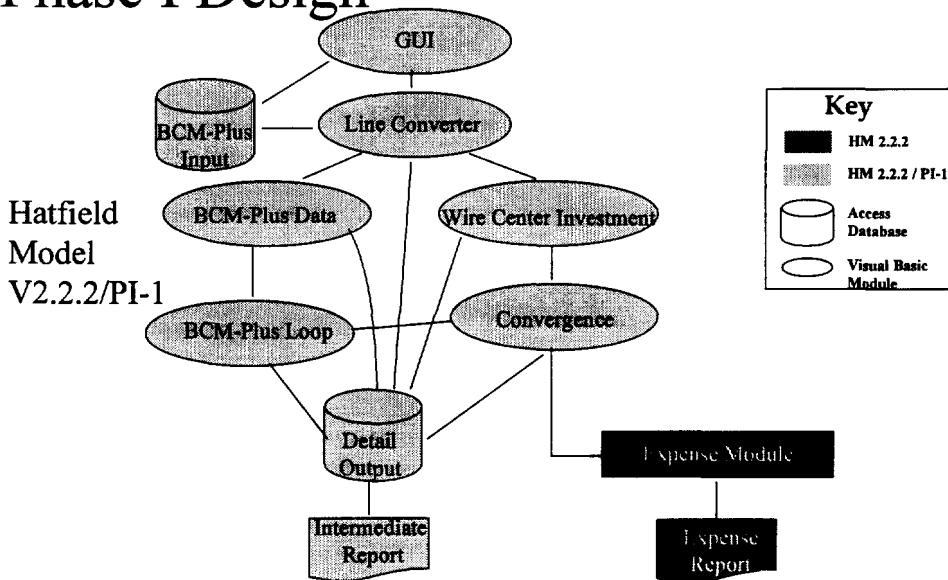
1.1 Model Overview

The Performance Improved Hatfield Model (HM2.2.2/PI-1) provides functionality identical to that of the Hatfield Model Version 2.2 Release 2 (HM2.2.2). The HM2.2.2/PI-1 transfers the functionality of HM2.2.2 from Microsoft Excel to Microsoft Access and Visual Basic in order to significantly improve performance.

The target platform for processing individual states is a 120 MHz Pentium with 32 Meg of RAM and an 800 Meg hard disk. The operating environment is Windows NT 3.5.1 or Windows 95 with Microsoft Excel 7.0 and Microsoft Access 7.0.

The design for HM2.2.2/PI-1 parallels that of HM2.2.2. All calculations prior to the Expense Module are accomplished with Microsoft Access and Visual Basic, rather than with Excel, but identical logic is used. A data dictionary was created listing all variables and their exact formulas as taken from the Excel spreadsheets of HM2.2.2. All of these variable formulas were copied and rewritten as formulas in Access or Visual Basic. Thus, HM2.2.2/PI-1 uses the exact same variables and calculations as HM2.2.2. The Expense Module has been taken intact from HM2.2.2. The Excel Expense Module performs the final calculations and produces the report. This parallel design facilitates testing the application and incorporating future changes in the model.

Performance Improved Hatfield Model Phase I Design



1.2 Description of Access / Visual Basic

Microsoft Access is a PC-based database application. HM2.2.2/PI-1 uses Access to store all input, intermediate results and output data in related tables. HM2.2.2/PI-1 employs SQL commands to select data, perform calculations, and save the results back to the database. Visual Basic provides a user interface to the application as well as initiating the SQL commands and performing some calculations.

There are several technical advantages of moving the Hatfield model from Excel to Access and Visual Basic. The new application is much smaller and requires less harddisk space to store and run. In addition, the new application provides improved performance. Excel requires substantially more time to perform I/O operations such as opening and saving files. Access eliminates some of the time required for I/O operations and instead focuses on the calculations and computations required to achieve a result.

2. DATA DICTIONARY

2.1 Model Attributes

The Model Attributes contain all user input variables that can be changed through the application's GUI. In addition, the Model Attributes contain any derived calculations based on the user inputs or on other derived values within this group.

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Line Counts						
Residential	LCRes	LineConv	Integer	-	V3	Output
Business	LCBus	LineConv	Integer	-	W3	Output
Special Access	LCSA	LineConv	Integer	-	X3	Output
Public	LCPub	LineConv	Integer	-	Y3	Output
Fill Factors						
Cable						
<i>Feeder</i>						
0-5	Feeder0	Loopmaster	Real	0.65	S18	Input
5-200	Feeder5	Loopmaster	Real	0.75	S19	Input
200-650	Feeder200	Loopmaster	Real	0.80	S20	Input
650-850	Feeder650	Loopmaster	Real	0.80	S21	Input
850-2550	Feeder850	Loopmaster	Real	0.80	S22	Input
2550+	Feeder2550	Loopmaster	Real	0.80	S23	Input
<i>Distribution</i>						
0-5	Dist0	Loopmaster	Real	0.50	T18	Input
5-200	Dist5	Loopmaster	Real	0.55	T19	Input
200-650	Dist200	Loopmaster	Real	0.60	T20	Input
650-850	Dist650	Loopmaster	Real	0.65	T21	Input
850-2550	Dist850	Loopmaster	Real	0.70	T22	Input
2550+	Dist2550	Loopmaster	Real	0.75	T23	Input
EO Switching Parameters						
Busy hour call attempts, residential	BHCAR	WireCenter	Real	1.3	F28	traffic and cost inputs
Busy hour call attempts, business	BHCAB	WireCenter	Real	3.5	F29	traffic and cost inputs
Switch Maximum Line Size	MaxLines	WireCenter	Integer	100,000	C27	traffic and cost inputs
Switch Maximum Line Fill	MaxLineFill	WireCenter	Real	0.8	C29	traffic and cost inputs
Switch Maximum Processor Occupancy	MaxProc	WireCenter	Real	0.9	C30	traffic and cost inputs
Processor Feature Loading Multiplier	FeatureMult	WireCenter	Real	1	C31	traffic and cost inputs
Switch Installation Multiplier	InstallMult	WireCenter	Real	1.1	C33	traffic and cost inputs
<i>Switch Parameters</i>						
Switch real-time limit, BHCA						
1 - 1,000	BHCA1	WireCenter	Integer	10,000	C16	traffic and cost inputs
1,000 - 10,000	BHCA2	WireCenter	Integer	50,000	C17	traffic and cost inputs
10,000 - 40,000	BHCA3	WireCenter	Integer	200,000	C18	traffic and cost inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet	
40,000+	BHCA4	WireCenter	Integer	600,000	C19	traffic and cost inputs	
Switch traffic limit, BHCCS							
1 - 1,000	BHCCS1	WireCenter	Integer	10,000	C23	traffic and cost inputs	
1,000 - 10,000	BHCCS2	WireCenter	Integer	50,000	C24	traffic and cost inputs	
10,000 - 40,000	BHCCS3	WireCenter	Integer	500,000	C25	traffic and cost inputs	
40,000+	BHCCS4	WireCenter	Integer	1,000,000	C26	traffic and cost inputs	
<i>Switch cost points</i>				lines			
Low line size	LowSize	WireCenter	Integer	2,782	F6	traffic and cost inputs	
Mid line size	MidSize	WireCenter	Integer	11,200	G6	traffic and cost inputs	
High line size	HighSize	WireCenter	Integer	80,000	H6	traffic and cost inputs	
				cost/line			
Low line size	LowCost	WireCenter	Currency	\$220.00	F5	traffic and cost inputs	
Mid line size	MidCost	WireCenter	Currency	\$86.00	G5	traffic and cost inputs	
High line size	HighCost	WireCenter	Currency	\$59.00	H5	traffic and cost inputs	
Residential Holding Time Multiplier	resHT	WireCenter	Real		1.00	F19	traffic and cost inputs
Business Holding Time Multiplier	busHT	WireCenter	Real		1.00	F20	traffic and cost inputs
Busy Hour fraction of daily usage	BHF	WireCenter	Real		0.10	F16	traffic and cost inputs
Annual to daily usage reduction factor	UsRed	WireCenter	Real		270.00	F17	traffic and cost inputs
Interoffice and Tandem Parameters							
Operator Traffic Fraction	OpFrac	WireCenter	Real	0.02	C39	traffic and cost inputs	
Total Interoffice Traffic Fraction	InterFrac	WireCenter	Real	0.65	C40	traffic and cost inputs	
Direct-Routed Fraction of Local Interoffice	DirectFrac	WireCenter	Real	0.98	C43	traffic and cost inputs	
Maximum Trunk Occupancy, CCS	TrunkCCS	WireCenter	Real	27.5	C46	traffic and cost inputs	
Trunk Termination Investment, per end	TermInv	WireCenter	Currency	\$100	C47	traffic and cost inputs	
Average Direct Route Distance, miles	Miles	WireCenter	Real	10	C48	traffic and cost inputs	

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Average Trunk Usage Fraction	TrunkFrac	WireCenter	Real	0.3	C50	traffic and cost inputs
<i>Toll traffic inputs</i>						
Tandem-routed % of total intraLATA traffic	tandLATA	WireCenter	Real	0.2	F82	traffic and cost inputs
Average direct intraLATA route distance, mi.	LATAdist	WireCenter	Real	25	F83	traffic and cost inputs
Tandem-routed % of total interLATA traffic	tandAccess	WireCenter	Real	0.2	F85	traffic and cost inputs
Average direct access route distance, mi.	Accessdist	WireCenter	Real	15	F86	traffic and cost inputs
<i>Tandem Switching parameters</i>						
real time limit, BHCA	tandBHCA	WireCenter	Real	1,500,000	C53	traffic and cost inputs
port limit, trunks	portlimit	WireCenter	Real	120,000	C54	traffic and cost inputs
common equipment investment	tandcominv	WireCenter	Currency	\$1,000,000	C55	traffic and cost inputs
maximum trunk fill	maxtrunkfill	WireCenter	Real	0.8	C56	traffic and cost inputs
maximum real time occupancy	tandmaxocc	WireCenter	Real	0.9	C57	traffic and cost inputs
common equipment intercept factor	tandintercept	WireCenter	Real	0.25	C58	traffic and cost inputs
<i>Wire Center Parameters</i>						
Lot size, multiplier of switch room size	LotSize	WireCenter	Real	2	C71	traffic and cost inputs
Tandem/EO wire center common factor	WCcomm	WireCenter	Real	0.4	C73	traffic and cost inputs
<i>Power and frame investment</i>				sum of power & frame		
0	PF1	WireCenter	Currency	\$10,000	C83	traffic and cost inputs
±,000	PF2	WireCenter	Currency	\$20,000	C84	traffic and cost inputs
±,000	PF3	WireCenter	Currency	\$40,000	C85	traffic and cost inputs
±5,000	PF4	WireCenter	Currency	\$100,000	C86	traffic and cost inputs
±0,000	PF5	WireCenter	Currency	\$500,000	C87	traffic and cost inputs
<i>Switch Room size table</i>				floor area required		

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
0	Room1	WireCenter	Real	500	C92	traffic and cost inputs
\$,000	Room2	WireCenter	Real	1,000	C93	traffic and cost inputs
\$,000	Room3	WireCenter	Real	2,000	C94	traffic and cost inputs
\$5,000	Room4	WireCenter	Real	5,000	C95	traffic and cost inputs
\$0,000	Room5	WireCenter	Real	10,000	C96	traffic and cost inputs
<i>Construction costs, per sq ft</i>				construction/\$/sq ft		
0	Const1	WireCenter	Currency	\$75	C102	traffic and cost inputs
\$,000	Const2	WireCenter	Currency	\$85	C103	traffic and cost inputs
\$,000	Const3	WireCenter	Currency	\$100	C104	traffic and cost inputs
\$5,000	Const4	WireCenter	Currency	\$125	C105	traffic and cost inputs
\$0,000	Const5	WireCenter	Currency	\$150	C106	traffic and cost inputs
<i>Land price, per sq ft</i>				price/sq ft		
0	Land1	WireCenter	Currency	\$5.00	C111	traffic and cost inputs
\$,000	Land2	WireCenter	Currency	\$7.50	C112	traffic and cost inputs
\$,000	Land3	WireCenter	Currency	\$10.00	C113	traffic and cost inputs
\$5,000	Land4	WireCenter	Currency	\$15.00	C114	traffic and cost inputs
\$0,000	Land5	WireCenter	Currency	\$20.00	C115	traffic and cost inputs
Distribution Structure Inputs						
<i>Aerial Fraction</i>						
0-5	distaerial1	Convergence	Real	0.5	C46	Inputs
5-200	distaerial2	Convergence	Real	0.5	C47	Inputs
200-650	distaerial3	Convergence	Real	0.5	C48	Inputs
650-850	distaerial4	Convergence	Real	0.5	C49	Inputs
850-2550	distaerial5	Convergence	Real	0.4	C50	Inputs
2550+	distaerial6	Convergence	Real	0.65	C51	Inputs
<i>Buried Fraction</i>						
0-5	distbur1	Convergence	Real	0.5	D46	Inputs
5-200	distbur2	Convergence	Real	0.5	D47	Inputs
200-650	distbur3	Convergence	Real	0.5	D48	Inputs
650-850	distbur4	Convergence	Real	0.5	D49	Inputs
850-2550	distbur5	Convergence	Real	0.5	D50	Inputs
2550+	distbur6	Convergence	Real	0.05	D51	Inputs
<i>Underground Fraction</i>						
0-5	distug_1	Calculated	Real	0	E46	Inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
5-200	distug_2	Calculated	Real	0	E47	Inputs
200-650	distug_3	Calculated	Real	0	E48	Inputs
650-850	distug_4	Calculated	Real	0	E49	Inputs
850-2550	distug_5	Calculated	Real	0.1	E50	Inputs
2550+	distug_6	Calculated	Real	0.3	E51	Inputs
<i>Buried Installation/foot</i>						
0-5	distburinv1	Convergence	Currency	\$2.00	G46	Inputs
5-200	distburinv2	Convergence	Currency	\$2.00	G47	Inputs
200-650	distburinv3	Convergence	Currency	\$2.00	G48	Inputs
650-850	distburinv4	Convergence	Currency	\$3.00	G49	Inputs
850-2550	distburinv5	Convergence	Currency	\$3.00	G50	Inputs
2550+	distburinv6	Convergence	Currency	\$20.00	G51	Inputs
<i>Conduit Installation/foot</i>						
0-5	distcondinv1	Convergence	Currency	\$25.00	H46	Inputs
5-200	distcondinv2	Convergence	Currency	\$25.00	H47	Inputs
200-650	distcondinv3	Convergence	Currency	\$25.00	H48	Inputs
650-850	distcondinv4	Convergence	Currency	\$25.00	H49	Inputs
850-2550	distcondinv5	Convergence	Currency	\$45.00	H50	Inputs
2550+	distcondinv6	Convergence	Currency	\$70.00	H51	Inputs
Pole spacing, feet	distpolespace	Convergence	Real	150	C53	Inputs
Pole investment	distpoleinv	Convergence	Currency	\$450	C54	Inputs
Conduit investment per foot	distcondinv	Convergence	Currency	\$1.00	C55	Inputs
Manhole investment, per manhole	distmanhinv	Convergence	Currency	\$3,000	C56	Inputs
Buried cable armoring multiplier	distarmormult	Convergence	Real	1.1	C57	Inputs
<i>Copper Feeder Structure Inputs</i>						
<i>Aerial Fraction</i>						
0-5	cufeedaerial1	Convergence	Real	0.5	C64	Inputs
5-200	cufeedaerial2	Convergence	Real	0.5	C65	Inputs
200-650	cufeedaerial3	Convergence	Real	0.5	C66	Inputs
650-850	cufeedaerial4	Convergence	Real	0.4	C67	Inputs
850-2550	cufeedaerial5	Convergence	Real	0.1	C68	Inputs
2550+	cufeedaerial6	Convergence	Real	0.05	C69	Inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet	
<i>Buried Fraction</i>							
0-5	cufeedbur1	Convergence	Real	0.45	D64	Inputs	
5-200	cufeedbur2	Convergence	Real	0.45	D65	Inputs	
200-650	cufeedbur3	Convergence	Real	0.45	D66	Inputs	
650-850	cufeedbur4	Convergence	Real	0.4	D67	Inputs	
850-2550	cufeedbur5	Convergence	Real	0.1	D68	Inputs	
2550+	cufeedbur6	Convergence	Real	0.05	D69	Inputs	
<i>Underground Fraction</i>							
0-5	cufeeddug1	Calculated	Real	0.05	E64	Inputs	
5-200	cufeeddug2	Calculated	Real	0.05	E65	Inputs	
200-650	cufeeddug3	Calculated	Real	0.05	E66	Inputs	
650-850	cufeeddug4	Calculated	Real	0.2	E67	Inputs	
850-2550	cufeeddug5	Calculated	Real	0.8	E68	Inputs	
2550+	cufeeddug6	Calculated	Real	0.9	E69	Inputs	
<i>Buried Installation/foot</i>							
0-5	cufeedburinv1	Convergence	Currency	\$2.00	G64	Inputs	
5-200	cufeedburinv2	Convergence	Currency	\$2.00	G65	Inputs	
200-650	cufeedburinv3	Convergence	Currency	\$2.00	G66	Inputs	
650-850	cufeedburinv4	Convergence	Currency	\$3.00	G67	Inputs	
850-2550	cufeedburinv5	Convergence	Currency	\$3.00	G68	Inputs	
2550+	cufeedburinv6	Convergence	Currency	\$25.00	G69	Inputs	
<i>Conduit Installation/foot</i>							
0-5	cufeedcondinv1	Convergence	Currency	\$25.00	H64	Inputs	
5-200	cufeedcondinv2	Convergence	Currency	\$25.00	H65	Inputs	
200-650	cufeedcondinv3	Convergence	Currency	\$25.00	H66	Inputs	
650-850	cufeedcondinv4	Convergence	Currency	\$25.00	H67	Inputs	
850-2550	cufeedcondinv5	Convergence	Currency	\$45.00	H68	Inputs	
2550+	cufeedcondinv6	Convergence	Currency	\$75.00	H69	Inputs	
<i>Manhole Spacing, ft.</i>							
0-5	cufeedman1	Convergence	Real		800	F64	Inputs
5-200	cufeedman2	Convergence	Real		800	F65	Inputs
200-650	cufeedman3	Convergence	Real		800	F66	Inputs
650-850	cufeedman4	Convergence	Real		800	F67	Inputs
850-2550	cufeedman5	Convergence	Real		600	F68	Inputs
2550+	cufeedman6	Convergence	Real		400	F69	Inputs
Pole spacing, feet	cufeedpolespace	Convergence	Real	150	C71	Inputs	

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Pole investment	cufeedpoleinv	Convergence	Currency	\$450	C72	Inputs
Conduit investment per foot	cufeedcondinv	Convergence	Currency	\$1.00	C73	Inputs
Manhole investment, per manhole	cufeedmanhinv	Convergence	Currency	\$3,000	C74	Inputs
Buried cable armoring multiplier	cufeedarmormult	Convergence	Real	1.1	C75	Inputs
Fiber Feeder Structure Inputs						
<i>Aerial Fraction</i>						
0-5	fibfeedaerial1	Convergence	Real	0.35	C81	Inputs
5-200	fibfeedaerial2	Convergence	Real	0.35	C82	Inputs
200-650	fibfeedaerial3	Convergence	Real	0.35	C83	Inputs
650-850	fibfeedaerial4	Convergence	Real	0.2	C84	Inputs
850-2550	fibfeedaerial5	Convergence	Real	0.1	C85	Inputs
2550+	fibfeedaerial6	Convergence	Real	0.05	C86	Inputs
<i>Buried Fraction</i>						
0-5	fibfeedbur1	Convergence	Real	0.6	D81	Inputs
5-200	fibfeedbur2	Convergence	Real	0.6	D82	Inputs
200-650	fibfeedbur3	Convergence	Real	0.6	D83	Inputs
650-850	fibfeedbur4	Convergence	Real	0.6	D84	Inputs
850-2550	fibfeedbur5	Convergence	Real	0.1	D85	Inputs
2550+	fibfeedbur6	Convergence	Real	0.05	D86	Inputs
<i>Underground Fraction</i>						
0-5	fibfeeddug1	Calculated	Real	0.05	E81	Inputs
5-200	fibfeeddug2	Calculated	Real	0.05	E82	Inputs
200-650	fibfeeddug3	Calculated	Real	0.05	E83	Inputs
650-850	fibfeeddug4	Calculated	Real	0.2	E84	Inputs
850-2550	fibfeeddug5	Calculated	Real	0.8	E85	Inputs
2550+	fibfeeddug6	Calculated	Real	0.9	E86	Inputs
<i>Buried Installation/foot</i>						
0-5	fibfeedburinv1	Convergence	Currency	\$2.00	G81	Inputs
5-200	fibfeedburinv2	Convergence	Currency	\$2.00	G82	Inputs
200-650	fibfeedburinv3	Convergence	Currency	\$2.00	G83	Inputs
650-850	fibfeedburinv4	Convergence	Currency	\$3.00	G84	Inputs
850-2550	fibfeedburinv5	Convergence	Currency	\$3.00	G85	Inputs
2550+	fibfeedburinv6	Convergence	Currency	\$20.00	G86	Inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet	
<i>Conduit Installation/foot</i>							
0-5	fibfeedcondinv1	Convergence	Currency	\$25.00	H81	Inputs	
5-200	fibfeedcondinv2	Convergence	Currency	\$25.00	H82	Inputs	
200-650	fibfeedcondinv3	Convergence	Currency	\$25.00	H83	Inputs	
650-850	fibfeedcondinv4	Convergence	Currency	\$25.00	H84	Inputs	
850-2550	fibfeedcondinv5	Convergence	Currency	\$45.00	H85	Inputs	
2550+	fibfeedcondinv6	Convergence	Currency	\$70.00	H86	Inputs	
<i>Manhole Spacing, ft.</i>							
0-5	fibfeedman1	Convergence	Real		2,000	F81	Inputs
5-200	fibfeedman2	Convergence	Real		2,000	F82	Inputs
200-650	fibfeedman3	Convergence	Real		2,000	F83	Inputs
650-850	fibfeedman4	Convergence	Real		2,000	F84	Inputs
850-2550	fibfeedman5	Convergence	Real		2,000	F85	Inputs
2550+	fibfeedman6	Convergence	Real		2,000	F86	Inputs
<i>Buried cable armoring per foot, fiber</i>	fibfeedarmormult	Convergence	Currency	\$0.20	C88	Inputs	
<i>Misc Loop Investment Inputs</i>							
Drop investment per line	dropinv	Convergence	Currency	\$40.00	J3	Inputs	
NID investment per line	NIDInv	Convergence	Currency	\$30.00	J4	Inputs	
Terminal and splice per line	SpliceInv	Convergence	Currency	\$35.00	J5	Inputs	
Average lines per business location	BusLinesLoc	Convergence	Real	4	J6	Inputs	
Feeder structure fraction shared w/ interoffice	FeedShare		Real	0.25			
<i>Distribution structure % assigned to telephone</i>							
aerial	AirDistTel	Expense	Percent	0.33	F59	Inputs	
buried	BurDistTel	Expense	Percent	0.33	H59	Inputs	
underground	UgDistTel	Expense	Percent	0.33	G59	Inputs	
<i>Feeder structure % assigned to telephone</i>							
aerial	AirFeedTel	Expense	Percent	0.33	F60	Inputs	
buried	BurFeedTel	Expense	Percent	0.33	H60	Inputs	

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
underground	UgFeedTel	Expense	Percent	0.33	G60	Inputs
<i>SAI Investment, installed</i>						
<i>Distribution cable size</i>				copper feeder		
0	cuSAI1	Convergence	Currency	\$500.00	I16	Inputs
100	cuSAI2	Convergence	Currency	\$700.00	I17	Inputs
200	cuSAI3	Convergence	Currency	\$900.00	I18	Inputs
400	cuSAI4	Convergence	Currency	\$1,100.00	I19	Inputs
600	cuSAI5	Convergence	Currency	\$1,300.00	I20	Inputs
900	cuSAI6	Convergence	Currency	\$1,500.00	I21	Inputs
1200	cuSAI7	Convergence	Currency	\$1,700.00	I22	Inputs
1800	cuSAI8	Convergence	Currency	\$1,900.00	I23	Inputs
2400	cuSAI9	Convergence	Currency	\$2,100.00	I24	Inputs
3000	cuSAI10	Convergence	Currency	\$2,300.00	I25	Inputs
3600	cuSAI11	Convergence	Currency	\$2,500.00	I26	Inputs
<i>Distribution cable size</i>				fiber feeder		
0	fibSAI1	Convergence	Currency	\$2,500.00	J16	Inputs
100	fibSAI2	Convergence	Currency	\$2,700.00	J17	Inputs
200	fibSAI3	Convergence	Currency	\$2,900.00	J18	Inputs
400	fibSAI4	Convergence	Currency	\$3,100.00	J19	Inputs
600	fibSAI5	Convergence	Currency	\$3,300.00	J20	Inputs
900	fibSAI6	Convergence	Currency	\$3,500.00	J21	Inputs
1200	fibSAI7	Convergence	Currency	\$3,700.00	J22	Inputs
1800	fibSAI8	Convergence	Currency	\$3,900.00	J23	Inputs
2400	fibSAI9	Convergence	Currency	\$4,100.00	J24	Inputs
3000	fibSAI10	Convergence	Currency	\$4,300.00	J25	Inputs
3600	fibSAI11	Convergence	Currency	\$4,500.00	J26	Inputs
<i>Digital Loop Carrier Inputs</i>						
<i>SLC (TR-303)</i>						
site, housing, and power per remote terminal	SLChouse	Convergence	Currency	\$3,000.00	D26	Inputs
maximum lines	SLCmaxlines	Convergence	Integer	672	D27	Inputs
remote terminal fill factor	SLCfill	Convergence	Real	0.9	D28	Inputs
common equipment investment	SLCcomm	Convergence	Currency	\$42,000.00	D29	Inputs
channel unit investment per line	SLCchan	Convergence	Currency	\$75.00	D30	Inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
DS-0s per fiber	SLCds0fiber	Loopmaster	Currency	\$2,016.00	X19	Input
Fibers per remote terminal	SLCfiberremote	Loopmaster	Integer	4	Y19	Input
AFC						
site, housing, and power per remote terminal	AFChouse	Convergence	Currency	\$2,500.00	D34	Inputs
maximum lines	AFCmaxlines	Convergence	Integer	100	D35	Inputs
remote terminal fill factor	AFCfill	Convergence	Real	0.9	D36	Inputs
common equipment investment	AFCcomm	Convergence	Currency	\$10,000.00	D37	Inputs
channel unit investment per line	AFCchan	Convergence	Currency	\$150.00	D38	Inputs
DS-0s per fiber	AFCds0fiber	Loopmaster	Integer	2,016	X20	Input
Fibers per remote terminal	AFCfiberremote	Loopmaster	Integer	4	Y20	Input
Fiber feeder distance threshold, ft. (feeder length)	Digfiberfeeddist	Loopmaster	Real	9,000	W23	Input
Signaling Parameters						
STP Link Capacity	STPcap	WireCenter	Real	720	F39	traffic and cost inputs
STP Maximum Fill	STPfill	WireCenter	Real	0.8	F40	traffic and cost inputs
STP Investment, per pair, fully equipped	STPInv	WireCenter	Currency	\$5,000,000.00	F41	traffic and cost inputs
STP common equipment investment, per pair	STPcomm	WireCenter	Currency	\$1,000,000.00	F42	traffic and cost inputs
Link Termination, both ends	LinkTerm	WireCenter	Currency	\$900.00	F43	traffic and cost inputs
Signaling Link Bit Rate	LinkRate	WireCenter	Real	56000	F45	traffic and cost inputs
Link Occupancy	LinkOcc	WireCenter	Real	0.4	F46	traffic and cost inputs
C Link Cross-Section	LinkCross	WireCenter	Real	24	F47	traffic and cost inputs
ISUP messages per interoffice BHCA	ISUPmsgs	WireCenter	Real	6	F48	traffic and cost inputs
ISUP message length, bytes	ISUPlen	WireCenter	Real	25	F49	traffic and cost inputs
TCAP messages per transaction	TCAPmsgs	WireCenter	Real	2	F51	traffic and cost inputs
TCAP message length, bytes	TCAPlen	WireCenter	Real	100	F52	traffic and cost inputs
Fraction of BHCA requiring TCAP	TCAPFrac	WireCenter	Real	0.1	F53	traffic and cost inputs
SCP investment per transaction per second	SCPInv	WireCenter	Currency	\$20,000.00	F54	traffic and cost inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Misc Inputs						
<i>Operator position parameters</i>						
Investment per position	opinv	WireCenter	Currency	\$3,500.00	C62	traffic and cost inputs
Maximum utilization per position, CCS	opccs	WireCenter	Real	27	C63	traffic and cost inputs
Operator intervention factor	opint	WireCenter	Real	10	C64	traffic and cost inputs
Operator position remote distance, mi.	opdist	WireCenter	Real	0	C65	traffic and cost inputs
<i>Other</i>						
DS0/DS1 crossover	DS0cross	Expense	Integer	24	C60	Inputs
DS1/DS3 crossover	DS1cross	Expense	Integer	28	C61	Inputs
Public Telephone investment per station	PubInv	WireCenter	Currency	\$1,200.00	F130	traffic and cost inputs
Transport Investment						
<i>Terminal Investment</i>						
Number of Fibers	termfib	WireCenter	Integer	24	C142	traffic and cost inputs
FOT capacity, DS-3s	FOTcap	WireCenter	Integer	12	C143	traffic and cost inputs
FOT fill	FOTfill	WireCenter	Real	0.8	C144	traffic and cost inputs
FOT, installed	FOTinst	WireCenter	Currency	\$43,000.00	C145	traffic and cost inputs
Pigtails	pigs	WireCenter	Currency	\$60.00	C146	traffic and cost inputs
Panel	panel	WireCenter	Currency	\$1,000.00	C147	traffic and cost inputs
EF&I, per hour	efi	WireCenter	Currency	\$55.00	C148	traffic and cost inputs
EF&I units	EFIU	WireCenter	Integer		32	D148
<i>Medium Investment</i>						
Fraction of structure assigned to telephone	telfrac	WireCenter	Real	0.33	C152	traffic and cost inputs
Fraction of structure shared with feeder	feedfrac	WireCenter	Real	0.25	C153	traffic and cost inputs
Distance, mi.	dist	WireCenter	Real	41	C154	traffic and cost inputs
Regenerator spacing, mi.	regensp	WireCenter	Real	40	C155	traffic and cost inputs
Regenerator investment, installed	regeninv	WireCenter	Currency	\$15,000.00	C157	traffic and cost inputs
Fiber Cable investment per foot	fibinv	WireCenter	Currency	\$2.00	C159	traffic and cost inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Placement	fibplace	WireCenter	Currency	\$2.00	C160	traffic and cost inputs
Splice Spacing, ft.	splicesp	WireCenter	Currency	20000	C161	traffic and cost inputs
Splice Cost	splice	WireCenter	Currency	\$15.00	C162	traffic and cost inputs
Trenching per foot	trench	WireCenter	Currency	\$45.00	C163	traffic and cost inputs
Resurfacing per foot	resurf	WireCenter	Currency	\$10.00	C164	traffic and cost inputs
Conduit per foot	condt	WireCenter	Currency	\$4.00	C165	traffic and cost inputs
Number of tubes	tubes	WireCenter	Integer	2	C166	traffic and cost inputs
Manhole investment	manhinv	WireCenter	Currency	\$5,000.00	C170	traffic and cost inputs
Manhole spacing	manhsp	WireCenter	Real	1000	C169	traffic and cost inputs
Buried installation per foot	burinst	WireCenter	Currency	\$5.00	C173	traffic and cost inputs
Pole investment	poleinv	WireCenter	Currency	450	C175	traffic and cost inputs
Pole spacing	polesp	WireCenter	Real	150	C176	traffic and cost inputs
Underground percent	ugfrac	WireCenter	Percent	35.00%	C179	traffic and cost inputs
Buried percent	burfrac	WireCenter	Percent	50.00%	C180	traffic and cost inputs
Aerial percent	airfrac	WireCenter	Percent	0.15	C181	traffic and cost inputs
<hr/>						
Call Attempts & DEMs						
<hr/>						
<i>Call Attempts</i>						
Local	CALocal	WireCenter	Integer		-	F66
IntraLata Intrapro	CARaRa	WireCenter	Integer		-	F68
InterLata Intrapro	CAErRa	WireCenter	Integer		-	F69
InterLata Interstate	CaErEr	WireCenter	Integer		-	F70
Call Completion Fraction	CallComp	WireCenter	Real	0.70		F67
<hr/>						
DEM s						
Local	DEMsLocal	WireCenter	Integer		-	F71
Intrapro	DEMsIntra	WireCenter	Integer		-	F72
Interstate	DEMsInter	WireCenter	Integer		-	F73
Local bus/res DEMs	LocalDF	WireCenter	Real	1.1		K78
Intrapro bus/res DEMs	IntraDF	WireCenter	Real	2		K79
Interstate bus/res DEMs	InterDF	WireCenter	Real	3		K80
<hr/>						
Cable Costs						
<i>Feeder</i>						
<i>Underground</i>						
Cable Size				Cost UG		
4200	FeedUG42	Loopmaster	Currency	74.25	T64	Input
3600	FeedUG36	Loopmaster	Currency	63.75	T65	Input
3000	FeedUG30	Loopmaster	Currency	53.25	T66	Input

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
2400	FeedUG24	Loopmaster	Currency	42.75	T67	Input
1800	FeedUG18	Loopmaster	Currency	32.25	T68	Input
1200	FeedUG12	Loopmaster	Currency	21.75	T69	Input
900	FeedUG9	Loopmaster	Currency	16.5	T70	Input
600	FeedUG6	Loopmaster	Currency	11.25	T71	Input
400	FeedUG4	Loopmaster	Currency	7.75	T72	Input
200	FeedUG2	Loopmaster	Currency	4.25	T73	Input
100	FeedUG1	Loopmaster	Currency	2.5	T74	Input
<i>Aerial</i>						
Cable Size						
4200	FeedA42	Loopmaster	Currency	74.25	U64	Input
3600	FeedA36	Loopmaster	Currency	63.75	U65	Input
3000	FeedA30	Loopmaster	Currency	53.25	U66	Input
2400	FeedA24	Loopmaster	Currency	42.75	U67	Input
1800	FeedA18	Loopmaster	Currency	32.25	U68	Input
1200	FeedA12	Loopmaster	Currency	21.75	U69	Input
900	FeedA9	Loopmaster	Currency	16.5	U70	Input
600	FeedA6	Loopmaster	Currency	11.25	U71	Input
400	FeedA4	Loopmaster	Currency	7.75	U72	Input
200	FeedA2	Loopmaster	Currency	4.25	U73	Input
100	FeedA1	Loopmaster	Currency	2.5	U74	Input
<i>Distribution</i>						
<i>Underground</i>						
Cable Size						
3600	DistUG36	Loopmaster	Currency	63.75	X64	Input
3000	DistUG30	Loopmaster	Currency	53.25	X65	Input
2400	DistUG24	Loopmaster	Currency	42.75	X66	Input
1800	DistUG18	Loopmaster	Currency	32.25	X67	Input
1200	DistUG12	Loopmaster	Currency	21.75	X68	Input
900	DistUG9	Loopmaster	Currency	16.5	X69	Input
600	DistUG6	Loopmaster	Currency	11.25	X70	Input
400	DistUG4	Loopmaster	Currency	7.75	X71	Input
200	DistUG2	Loopmaster	Currency	4.25	X72	Input
100	DistUG1	Loopmaster	Currency	2.5	X73	Input
50	DistUG5	Loopmaster	Currency	1.625	X74	Input
25	DistUG25	Loopmaster	Currency	1.19	X75	Input
<i>Aerial</i>						
Cable Size						
3600	DistA36	Loopmaster	Currency	63.75	Y64	Input
3000	DistA30	Loopmaster	Currency	53.25	Y65	Input

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
2400	DistA24	Loopmaster	Currency	42.75	Y66	Input
1800	DistA18	Loopmaster	Currency	32.25	Y67	Input
1200	DistA12	Loopmaster	Currency	21.75	Y68	Input
900	DistA9	Loopmaster	Currency	16.5	Y69	Input
600	DistA6	Loopmaster	Currency	11.25	Y70	Input
400	DistA4	Loopmaster	Currency	7.75	Y71	Input
200	DistA2	Loopmaster	Currency	4.25	Y72	Input
100	DistA1	Loopmaster	Currency	2.5	Y73	Input
50	DistA5	Loopmaster	Currency	1.625	Y74	Input
25	DistA25	Loopmaster	Currency	1.19	Y75	Input
<i>Fiber</i>						
<i>Underground</i>						
Cable Size				Cost UG		
216	FiberUG216	Loopmaster	Currency	13.1	W47	Input
144	FiberUG144	Loopmaster	Currency	9.5	W48	Input
96	FiberUG96	Loopmaster	Currency	7.1	W49	Input
72	FiberUG72	Loopmaster	Currency	5.9	W50	Input
60	FiberUG60	Loopmaster	Currency	5.3	W51	Input
48	FiberUG48	Loopmaster	Currency	4.7	W52	Input
36	FiberUG36	Loopmaster	Currency	4.1	W53	Input
24	FiberUG24	Loopmaster	Currency	3.5	W54	Input
18	FiberUG18	Loopmaster	Currency	3.2	W55	Input
12	FiberUG12	Loopmaster	Currency	2.9	W56	Input
<i>Aerial</i>						
Cable Size				Cost Aerial		
216	FiberA216	Loopmaster	Currency	13.1	X47	Input
144	FiberA144	Loopmaster	Currency	9.5	X48	Input
96	FiberA96	Loopmaster	Currency	7.1	X49	Input
72	FiberA72	Loopmaster	Currency	5.9	X50	Input
60	FiberA60	Loopmaster	Currency	5.3	X51	Input
48	FiberA48	Loopmaster	Currency	4.7	X52	Input
36	FiberA36	Loopmaster	Currency	4.1	X53	Input
24	FiberA24	Loopmaster	Currency	3.5	X54	Input
18	FiberA18	Loopmaster	Currency	3.2	X55	Input
12	FiberA12	Loopmaster	Currency	2.9	X56	Input
<i>Cost of Capital Factors</i>						
<i>Depreciation Lives</i>						
Loop Distribution	DistLife	Expense	Real	20	H37	Inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Loop Feeder	FeedLife	Expense	Real	20	H38	Inputs
Loop Concentrator	ConcLife	Expense	Real	10	H39	Inputs
Wire Center	WireLife	Expense	Real	37	H41	Inputs
Digital End Office Switching	EOLife	Expense	Real	14.3	H40	Inputs
Tandem Switching	TandLife	Expense	Real	14.3	H42	Inputs
Fiber Transport Facilities	TransLife	Expense	Real	19	H44	Inputs
Operator Systems	OpLife	Expense	Real	8	H43	Inputs
STP	STPLife	Expense	Real	14	H45	Inputs
SCP	SCPLife	Expense	Real	14	H46	Inputs
STP Links	LinkLife	Expense	Real	19	H47	Inputs
Public Telephones	PubLife	Expense	Real	9	H48	Inputs
General Support	GenLife	Expense	Real	7	H49	Inputs
<i>Cost of Capital</i>						
Debt Percent	DebtP	Expense	Percent	45.00%	C34	Inputs
Cost of Debt	DebtCost	Expense	Percent	7.70%	C35	Inputs
Cost of Equity	EquityCost	Expense	Percent	11.90%	C37	Inputs
<i>Equity Percent</i>						
<i>Overall Cost of Capital</i>		Calculated		55.00%		
<i>Misc Expense Factors</i>						
Variable Overhead Factor	VarOvhd	Expense	Percent	10.00%	C42	Inputs
Fed, St & Loc Inc Tax Rate	FITRate	Expense	Percent	40.00%	H35	Inputs
Operating Taxes	OtherTax	Expense	Percent	5.00%	C43	Inputs
Operating State and Local Income Tax Factor	StateIT	Expense	Percent	1.00%	C44	Inputs
Billing/Bill Inquiry per line per month	Billing	Expense	Currency	\$1.22	C45	Inputs
Directory Listing per line per month	Directory	Expense	Currency	\$0.15	C46	Inputs
Forward-Looking Network Operations Factor	NetOps	Expense	Percent	70.00%	C48	Inputs
Central Office Switching Expense Factor	COSwitch	Expense	Percent	2.69%	C47	Inputs
End Office Traffic-Sensitive Fraction	EOTraffic	Expense	Percent	70.00%	C51	Inputs
per-line Monthly LNP Cost	LNP	Expense	Currency	\$0.25	C52	Inputs
Dig CO switching factor	ACOSF	Expense	Real	0.0269	C49	Inputs
Dig circuit equipment factor	ACEF	Expense	Real	0.0153	C50	Inputs

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Carrier-carrier customer service per line per year	CarCar	Expense	Currency	\$1.56	C58	Inputs
NID expense per line per year	NIDExp	Expense	Currency	\$3.00	C59	Inputs
Switch line circuit offset per DLC line	CircOffs	Expense	Currency	\$35.00	C62	Inputs
Derived Model Attributes						
total business lines in service area	bus_line_sa			389005	Icbus	D5 Tandem and STP Inv
total residential lines in service area	res_line_sa			1032352	Icres	D6 Tandem and STP Inv
total public access lines in service area	pa_line_sa			21345	Icpub	D7 Tandem and STP Inv
total tandems in service area	tdm_sa	WireCenter		6	t_tandem	D4
total tandems	tot_tdm	WireCenter		6	tdm_sa	D45 Tandem and STP Inv
>2550 structure factor	2550Fctor	DataMaster		1.28		
NormalFiberDepth	FiberDepth	DataMaster		36		
NormalUGDepth	UGDepth	DataMaster		24		
Fill Factors for Electronics						
AFC	AFC_ele_fill	Loopmaster	Real	0.8	R12	Input
SLC	SLC_ele_fill	Loopmaster	Real	0.8	R13	Input
Switching	sw_ele_fill	Loopmaster	Real	0.8	R14	Input
DLC Investment per Access Line	DLC_inv_pl	Loopmaster	Currency	500	W11	Input
AFC Cost per Access Line	AFC_cost_pl	Loopmaster	Currency	550	W15	Input
DLC Investment per Access Line After discount	DLC_inv_pl_ad	Loopmaster	Currency	$DLC_cost_pl(1 - SLC_discnt/100)$	R94	Input
AFC Cost per Access Line After Discount	AFC_cost_pl_ad	Loopmaster	Currency	$AFC_cost_pl(1 - AFC_discnt/100)$	R93	Input
Maximum Copper Feeder Cable Size	max_cop_fed	Loopmaster	Real	4200	R6	Input
Maximum Copper Distribution Cable Size	max_cop_distr	Loopmaster	Real	3600	R8	Input
Fiber Cable Discount %	fib_discnt	Loopmaster	%	0	V29	Input
Copper Cable Discount %	cop_discnt	Loopmaster	%	0	V33	Input

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
AFC Electronics Discount %	AFC_Discont	Loopmaster	%	10	V37	Input
SLC electronics Discount %	SLC_Discont	Loopmaster	%	20	V41	Input
Fiber cable cost factor	fib_cost_fctr	Loopmaster	Real	1-fib_Discont/100	AS58	Costing
Copper Cable Cost factor	cop_cost_fctr	Loopmaster	Real	1-cop_Discont/100	AS61	Costing
Other Model Attributes						
Total tandems in study area	t_tandem	WireCenter	Real	State Dependent	F2	
Total tandem/STP distance	t_tandem_pSTP	WireCenter	Real	State Dependent	G2	
Total STP pairs in study area	t_STP	WireCenter	Real	State Dependent	H2	
Total STP/STP distance	t_STP_pSTP	WireCenter	Real	State Dependent	I2	
Intermediate	wc_tci_m5	WireCenter		LCRes	M5	
Intermediate	wc_tci_m6	WireCenter		LCBus	M6	
Intermediate	wc_tci_m7	WireCenter		LCPub	M7	
Intermediate	wc_tci_m8	WireCenter		LCSA	M8	
Intermediate	wc_tci_k68	WireCenter		demslocal / (localdf * wc_tci_m6 + wc_tci_m5) * 1000	K68	
Intermediate	wc_tci_k67	WireCenter		wc_tci_k68 * localdf	K67	
Intermediate	wc_tci_K72			demsintra / (intradf * wc_tci_m6 + wc_tci_m5) * 1000	K72	
Intermediate	wc_tci_K71			wc_tci_k72 * intradf	K71	
Intermediate	wc_tci_K76			demsinter / (interdf * wc_tci_m6 + wc_tci_m5) * 1000	K76	
Intermediate	wc_tci_K75			wc_tci_k76 * interdf	K75	
Intermediate	wc_tci_J88			(wc_tci_k67 + wc_tci_k71 + wc_tci_k75) * (1 - interfraction) * bhf / usred	J88	
Intermediate	wc_tci_K88			wc_tci_j88 * 60 / 100	K88	
Intermediate	wc_tci_J89			(wc_tci_k68 + wc_tci_k72 + wc_tci_k76) * (1 - interfraction) * bhf / usred	J89	
Intermediate	wc_tci_K89			wc_tci_j89 * 60 / 100	K89	
High line Slope	h_slope	WireCenter	Real	(highcost - midcost) / (highsize - midsize)	D5	
High line Intercept	h_intercept	WireCenter	Real	midcost - midsize * h_slope	D6	
Intermediate	wc_tci_C9			midsize	C9	
Intermediate	wc_tci_F11			midcost	F11	
Intermediate	wc_tci_F12			midsize	F12	
Intermediate	l_slope			(wc_tci_f11 - lowcost) / (wc_tci_f12 - lowsize)		
Intermediate	l_intercept			wc_tci_f11 - l_slope * wc_tci_f12		
Intermediate	CCS_res			resht * (wc_tci_k68 + wc_tci_k72 + wc_tci_k76) / usred * bhf * 60 / 100		

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Intermediate	CCS_bus			busht * (wc_tci_k67 + wc_tci_k71 + wc_tci_k75) / usred * bhf * 60 / 100		
Intermediate	res_hold			CCS_res * 100 / bhcar		
Intermediate	bus_hold			CCS_bus * 100 / bhcab		
Intermediate	wc_tci_F74			(demslocal + demsintra + demsinter)	F74	
Intermediate	wc_tci_F76			carara / (carara + caerra + caerer)	F76	
Intermediate	wc_tci_F77			1 - wc_tci_f76	F77	
Intermediate	wc_tci_F78			demslocal / wc_tci_f74 - opfrac	F78	
Intermediate	wc_tci_F79			(1 - demslocal / (demslocal + demsintra + demsinter)) * wc_tci_f76	F79	
Intermediate	wc_tci_F80			(1 - demslocal / (demslocal + demsintra + demsinter)) * wc_tci_f77	F80	
Intermediate	wc_tci_C42			recordset3.interfrac - recordset3.opfrac - wc_tci_f79 - wc_tci_f80	C42	
Intermediate	DEM_Fr			wc_tci_f78		
Intermediate	Int_Ofc_Fr			interfrac - opfrac - wc_tci_f79 - wc_tci_f80		
Intermediate	t_bhca			bus_line_sa * bhcab + res_line_sa * bhcar		
Intermediate	t_TCAP			tcapmsgs * tcapfrac * t_bhca / 3600		
Intermediate	t_SCP_pl			scpinv * recordset3.t_TCAP / (lcbus + lcre)		
Intermediate	pBHCA_load_f			(tcapmsgs * tcaplen * tcapfrac + Isupmsgs * isuplen * interfrac) * (8 / 3600) / (linkrate * linkocc)		
Intermediate	wc_tci_J92			(wc_tci_k67 + wc_tci_k71 + wc_tci_k75) * Int_Ofc_Fr / usred * bhf * (1 - DirectFrac)	J92	
Intermediate	wc_tci_J93			(wc_tci_k68 + wc_tci_k72 + wc_tci_k76) * Int_Ofc_Fr / usred * bhf * (1 - DirectFrac)	J93	
Intermediate	wc_tci_J94			(wc_tci_k67 + wc_tci_k71 + wc_tci_k75) * Int_Ofc_Fr / usred * bhf * DirectFrac	J94	
Intermediate	wc_tci_J95			(wc_tci_k68 + wc_tci_k72 + wc_tci_k76) * Int_Ofc_Fr / usred * bhf * DirectFrac	J95	
Intermediate	wc_tci_J98			tandlata * (wc_tci_k67 + wc_tci_k71 + wc_tci_k75) usred * bhf * wc_tci_f79	J98	
Intermediate	wc_tci_J99			tandlata * (wc_tci_k68 + wc_tci_k72 + wc_tci_k76) usred * bhf * wc_tci_f79	J99	
Intermediate	wc_tci_J100			(1 - tandlata) * (wc_tci_k67 + wc_tci_k71 + wc_tci_k75) / usred * bhf * wc_tci_f79	J100	
Intermediate	wc_tci_J101			(1 - tandlata) * (wc_tci_k68 + wc_tci_k72 + wc_tci_k76) / usred * bhf * wc_tci_f79	J101	
Intermediate	wc_tci_J104			wc_tci_f80 * (wc_tci_k67 + wc_tci_k71 + wc_tci_k75) * tandaccess / usred * bhf	J104	

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Intermediate	wc_tci_J106			wc_tci_f80 * (wc_tci_k67 + wc_tci_k71 + wc_tci_k75) * (1 - tandaccess) / usred * bhf	J106	
Intermediate	wc_tci_J105			wc_tci_f80 * (wc_tci_k68 + wc_tci_k72 + wc_tci_k76) * tandaccess / usred * bhf	J105	
Intermediate	wc_tci_J107			wc_tci_f80 * (wc_tci_k68 + wc_tci_k72 + wc_tci_k76) * (1 - tandaccess) / usred * bhf	J107	
Intermediate	wc_tci_K92			wc_tci_j92 * 0.6	K92	
Intermediate	wc_tci_K93			wc_tci_j93 * 0.6	K93	
Intermediate	wc_tci_K94			wc_tci_j94 * 0.6	K94	
Intermediate	wc_tci_K95			wc_tci_j95 * 0.6	K95	
Intermediate	wc_tci_K98			wc_tci_j98 * 0.6	K98	
Intermediate	wc_tci_K99			wc_tci_j99 * 0.6	K99	
Intermediate	wc_tci_K100			wc_tci_j100 * 0.6	K100	
Intermediate	wc_tci_K101			wc_tci_j101 * 0.6	K101	
Intermediate	wc_tci_K104			wc_tci_j104 * 0.6	K104	
Intermediate	wc_tci_K105			wc_tci_j105 * 0.6	K105	
Intermediate	wc_tci_K106			wc_tci_j106 * 0.6	K106	
Intermediate	wc_tci_K107			wc_tci_j107 * 0.6	K107	
Intermediate	wc_tci_J110			(wc_tci_k67 + wc_tci_k71 + wc_tci_k75) / usred * bhf * opfrac	J110	
Intermediate	wc_tci_J111			(wc_tci_k68 + wc_tci_k72 + wc_tci_k76) / usred * bhf * opfrac	J111	
Intermediate	wc_tci_K110			wc_tci_j110 * 0.6	K110	
Intermediate	wc_tci_K111			wc_tci_j111 * 0.6	K111	
Intermediate	wc_tci_J84			wc_tci_j88 + wc_tci_j92 + wc_tci_j94 + wc_tci_j98 + wc_tci_j100 + wc_tci_j104 + wc_tci_j106 + wc_tci_j110	J84	
Intermediate	wc_tci_J85			wc_tci_j89 + wc_tci_j93 + wc_tci_j95 + wc_tci_j99 + wc_tci_j101 + wc_tci_j105 + wc_tci_j107 + wc_tci_j111	J85	
Intermediate	wc_tci_K84			wc_tci_j84 * 0.6	K84	
Intermediate	wc_tci_K85			wc_tci_j85 * 0.6	K85	
Intermediate	res_swtrch			wc_tci_k89		
Intermediate	res_off_drt			wc_tci_k95		
Intermediate	res_off_tdm			wc_tci_k93		
Intermediate	res_OS			wc_tci_k111		
Intermediate	res_intra_tdm			wc_tci_k99		
Intermediate	res_intra_drt			wc_tci_k101		
Intermediate	res_inter_tdm			wc_tci_k105		
Intermediate	res_inter_drt			wc_tci_k107		

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Intermediate	load_res			res_swtrch + res_off_drt + res_off_tdm + res_OS + res_intra_tdm + res_intra_drt + res_inter_tdm + res_inter_drt		
Intermediate	bus_swtrch			wc_tci_k88		
Intermediate	bus_off_drt			wc_tci_k94		
Intermediate	bus_off_tdm			wc_tci_k92		
Intermediate	bus_OS			wc_tci_k110		
Intermediate	bus_intra_tdm			wc_tci_k98		
Intermediate	bus_intra_drt			wc_tci_k100		
Intermediate	bus_inter_tdm			wc_tci_k104		
Intermediate	bus_inter_drt			wc_tci_k106		
Intermediate	load_bus			bus_swtrch + bus_off_drt + bus_off_tdm + bus_OS + bus_intra_tdm + bus_intra_drt + bus_inter_tdm + bus_inter_drt		
Intermediate	wc_tci_D145			200.00%	D145	
Intermediate	wc_tci_D146			2 * termfib	D146	
Intermediate	wc_tci_D147			200.00%	D147	
Intermediate	wc_tci_E145			fotinst * wc_tci_d145	E145	
Intermediate	wc_tci_E146			pigs * wc_tci_d146	E146	
Intermediate	wc_tci_E147			panel * wc_tci_d147	E147	
Intermediate	wc_tci_E148			efi * efiu	E148	
Intermediate	wc_tci_E149			wc_tci_e145 + wc_tci_e146 + wc_tci_e147 + wc_tci_e148	E149	
Intermediate	wc_tci_C156			Fix(dist / regensp) 'Fix is vb for trunc	C156	
Intermediate	wc_tci_C158			wc_tci_c156 * regeninv	C158	
Intermediate	wc_tci_C167			(trench + tubes * condft + resurf) * telfrac * (1 - feedfrac / 2)	C167	
Intermediate	wc_tci_D159			5280 * dist	D159	
Intermediate	wc_tci_D160			wc_tci_d159	D160	
Intermediate	wc_tci_D162			wc_tci_d159 / splicesp	D162	
Intermediate	wc_tci_D167			wc_tci_d159	D167	
Intermediate	wc_tci_E159			fibinv * wc_tci_d159	E159	
Intermediate	wc_tci_E160			fibplace * wc_tci_d160	E160	
Intermediate	wc_tci_E162			wc_tci_d162 * splice * termfib	E162	
Intermediate	wc_tci_E167			wc_tci_c167 * wc_tci_d167	E167	
Intermediate	wc_tci_C171			-1 * Int(-1 * (wc_tci_d167 / manhsp))	C171	
Intermediate	wc_tci_E170			manhinv * wc_tci_c171	E170	
Intermediate	wc_tci_E172			wc_tci_e167 + wc_tci_e170	E172	
Intermediate	wc_tci_C174			burinst * telfrac	C174	
Intermediate	wc_tci_D174			wc_tci_d159	D174	
Intermediate	wc_tci_E174			wc_tci_c174 * wc_tci_d174	E174	

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Intermediate	wc_tci_C177			poleinv * telfrac * (1 - feedfrac / 2) / polesp	C177	
Intermediate	wc_tci_D177			-1 * Int(-1 * (wc_tci_d159 / polesp))	D177	
Intermediate	wc_tci_E177			wc_tci_c177 * wc_tci_d177	E177	
Intermediate	t_u/g_cs_pDS			(wc_tci_c158 + wc_tci_e159 + wc_tci_e160 + wc_tci_e162 + wc_tci_e172) / dist / (fotcap * fotfill * 672)		
Intermediate	t_br_cs_pDS			(wc_tci_c158 + wc_tci_e159 + wc_tci_e160 + wc_tci_e162 + wc_tci_e174) / dist / (fotcap * fotfill * 672)		
Intermediate	t_ar_cs_pDS			(wc_tci_c158 + wc_tci_e159 + wc_tci_e160 + wc_tci_e162 + wc_tci_e177) / dist / (fotcap * fotfill * 672)		
Intermediate				wc_tci_e172 / dist / (fotcap * fotfill * 672)	E183	
Intermediate				wc_tci_e177 / dist / (fotcap * fotfill * 672)	E185	
Intermediate	t_tm_cs_pds			wc_tci_e149 / (fotcap * fotfill * 672)		
Intermediate	t_wm_cs_pds			t_u/g_cs_pDS * ugfrac + t_br_cs_pDS * burfrac + t_ar_cs_pDS * airfrac		
Intermediate	t_tm_wm_pDS			recordset3.t_tm_cs_pds + dist * recordset3.t_wm_cs_pds		
Intermediate	t_wm_pds			wc_tci_e183 * ugfrac + wc_tci_e185 * airfrac		
Intermediate	wc_tci_E189			t_tm_wm_pDS / dist	E189	
Intermediate	wc_tci_D203			200.00%	D203	
Intermediate	wc_tci_D204			2 * termfib	D204	
Intermediate	wc_tci_D205			200.00%	D205	
Intermediate	wc_tci_E203			fotinst * wc_tci_d203	E203	
Intermediate	wc_tci_E204			pigs * wc_tci_d204	E204	
Intermediate	wc_tci_E205			panel * wc_tci_d205	E205	
Intermediate	wc_tci_E206			efi * efiu	E206	
Intermediate	wc_tci_E207			wc_tci_e203 + wc_tci_e204 + wc_tci_e205 + wc_tci_e206	E207	
Intermediate	wc_tci_C211			feedfrac	C211	
Intermediate	wc_tci_C212			miles	C212	
Intermediate	wc_tci_C214			Fix(wc_tci_c212 / regenesp)	C214	
Intermediate	wc_tci_C216			wc_tci_c214 * regeninv	C216	
Intermediate	wc_tci_D217			5280 * wc_tci_c212	D217	
Intermediate	wc_tci_D218			wc_tci_d217	D218	
Intermediate	wc_tci_D220			wc_tci_d217 / splicesp	D220	
Intermediate	wc_tci_E217			fibinv * wc_tci_d217	E217	
Intermediate	wc_tci_E218			fibplace * wc_tci_d218	E218	
Intermediate	wc_tci_E220			wc_tci_d220 * splice * termfib	E220	

Data Dictionary -- Model Attributes

Input Name	Name	Module	Type	Default	Cell Ref	Worksheet
Intermediate	wc_tci_C225			(trench + tubes * condft + resurf) * telfrac * (1 - wc_tci_c211)	C225	
Intermediate	wc_tci_D225			wc_tci_d217	D225	
Intermediate	wc_tci_E225			wc_tci_c225 * wc_tci_d225	E225	
Intermediate	wc_tci_C229			-1 * Int(-1 * (wc_tci_d225 / manhsp))	C229	
Intermediate	wc_tci_E228			manhinv * wc_tci_c229	E228	
Intermediate	wc_tci_C232			telfrac * burinst	C232	
Intermediate	wc_tci_D232			wc_tci_d217	D232	
Intermediate	wc_tci_E232			wc_tci_c232 * wc_tci_d232	E232	
Intermediate	wc_tci_C235			poleinv * telfrac * (1 - wc_tci_c211 / 2) / polesp	C235	
Intermediate	wc_tci_D235			-1 * Int(-1 * (wc_tci_d217 / polesp))	D235	
Intermediate	wc_tci_E230			e230 = wc_tci_e225 + wc_tci_e228	E230	
Intermediate	wc_tci_E235			wc_tci_c235 * wc_tci_d235	E235	
Intermediate	wc_tci_C237			ugfrac	C237	
Intermediate	wc_tci_C238			burfrac	C238	
Intermediate	wc_tci_C239			airfrac	C239	
Intermediate	l_u/g_cs_pDS			(wc_tci_c216 + wc_tci_e217 + wc_tci_e218 + wc_tci_e220 + wc_tci_e230) / wc_tci_c212 / (fotcap * fotfill * 672)		
Intermediate	l_br_cs_pDS			(wc_tci_c216 + wc_tci_e217 + wc_tci_e218 + wc_tci_e220 + wc_tci_e232) / wc_tci_c212 / (fotcap * fotfill * 672)		
Intermediate	l_ar_cs_pDS			(wc_tci_c216 + wc_tci_e217 + wc_tci_e218 + wc_tci_e220 + wc_tci_e235) / wc_tci_c212 / (fotcap * fotfill * 672)		
Intermediate	wc_tci_E241			wc_tci_e230 / wc_tci_c212 / (fotcap * fotfill * 672)	E241	
Intermediate	wc_tci_E243			wc_tci_e235 / wc_tci_c212 / (fotcap * fotfill * 672)	E243	
Intermediate	l_tm_cs_pDS			wc_tci_e207 / (fotcap * fotfill * 672)		
Intermediate	l_wm_cs_pDS			l_u/g_cs_pDS * wc_tci_c237 + l_br_cs_pDS * wc_tci_c238 + l_ar_cs_pDS * wc_tci_c239		
Intermediate	l_tm_wm_pDS			recordset3.l_tm_cs_pDS + wc_tci_c212 * recordset3.l_wm_cs_pDS		
Intermediate	l_wm_pds			wc_tci_e241 * wc_tci_c237 + wc_tci_e243 * wc_tci_c239		
Intermediate	wc_tci_E247			l_tm_wm_pDS / wc_tci_c212	E247	
Intermediate	wc_tci_D262			200.00%	D262	
Intermediate	wc_tci_D263			2 * termfib	D263	
Intermediate	wc_tci_D264			200.00%	D264	